ПЛЕНАРНЫЕ ДОКЛАДЫ

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ON THE THEORIES OF THE STRONGLY BOUNDED TURING DEGREES OF COMPUTABLY ENUMERABLE SETS

Recently two variants of strongly bounded Turing reductions have been introduced. An *identity bounded Turing* reduction (*ibT*-reduction for short) is a Turing reduction where no oracle query is greater than the input while a *computable Lipschitz* reduction (*cl*-reduction for short) is a Turing reduction where the oracle queries on input x are bounded by $x + c$ for some constant c.

In our talk we discuss some recent results on the first order theories of the partial orderings of the strongly bounded Turing degrees of the computably enumerable sets. In particular, we show that, for $r = ibT, cl$, the theory $\mathrm{Th}(\mathbf{R}_r, \leqslant)$ of the partial ordering of the c.e. r-degrees realizes infinitely many 1-types and is undecidable. Moreover, by investigating cupping properties, we show that the theories of the partial orderings $(\mathbf{R}_{ibT}, \leqslant)$ and $(\mathbf{R}_{cl}, \leqslant)$ are not elementarily equivalent (the latter is joint work with Bodewig, Fan and Kraling).

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CAUSALITY, COMPUTABILITY AND DEFINABILITY

Turing formalised the intuitive notion of computable causality via the notion of the oracle Turing machine. The model is

applicable to much of the real world, including basic Newtonian mechanics. But mathematically, definability over computable structures in formalised natural language takes us beyond the computable. We look at the extent to which this simple mathematics, and the rich mathematical theory of incomputability built on it, is relevant in a real context.

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IMAGINARY LOGIC AND THE LOGIC OF IMAGINATION

This article shows the main differences between imaginary logic proposed by N.A. Vasiliev (1910) and the logic of imagination proposed by I. Niiniluoto (1985). Moreover, it argues that the combined logics of imagination proposed by Costa-Leite (2010) are able to unify both approaches because they contain operators to deal with "it is imagined that..." and "it is conceived that..." at the same time. In this sense, they also show that the imaginary worlds proposed by Vasiliev are, indeed, worlds of conception.

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